CLAIMS

1. A method of enriching mesenchymal precursor cells, the method including the step of enriching for cells based on at least two markers, said markers being either:

a) the presence of markers specific for mesenchymal precursor cells, or

b) the absence of markers specific for differentiated mesenchymal precursor cells, or

c) the levels of expression of markers specific for differentiated mesenchymal cells.

2. A method of enriching mesenchymal precursor cells as in claim 1 wherein the method includes enriching by selecting for the positive expression of at least one of the markers.

3. A method of enriching mesenchymal precursor cells as in claim 2 wherein the method includes enriching by selecting for the positive expression of at least two of the markers.

4. A method of enriching mesenchymal precursor cells as in claim 3 wherein the markers are cell surface markers.

5. A method of enriching mesenchymal precursor cells as in claim 4 wherein the markers are selected from a group of surface markers specific for mesenchymal precursor cells including: LFA-3, THY-1, antigen identified by STRO-1, VCAM-1, ICAM-1, PECAM-1, P-selectin, L-selectin, CD49b/CD29, CD49c/CD29, CD49d/CD29, CD29, CD18, CD61, 6-19, thrombomodulin, CD10, CD13 and SCF.

6. A method of enriching mesenchymal precursor cells as in claim 5 wherein at least one of the markers is the antigen identified by STRO-1.

7. A method of enriching mesenchymal precursor cells as in claim 5 wherein at least one of the markers is VCAM-1.

8. A method of enriching mesenchymal precursor cells as in claim 5 wherein the two markers are the antigen identified by STRO-1, and VCAM-1.

9. A method of enriching mesenchymal precursor cells as in claim 4 wherein a proportion of the MPCs are capable of differentiation into at least two committed cell types selected from the group including adipose, areolar, osseous, cartilaginous, elastic and fibrous connective.

10. A method of enriching mesenchymal precursor cells as in claim 4 wherein the enrichment results in a cell population in which at least 1% of the cells are MPCs that are colony forming.

11. A method of enriching mesenchymal precursor cells as in claim 10 wherein the enrichment results in a cell population in which at least 5% of the cells are MPCs that are colony forming.

12. A method of enriching mesenchymal precursor cells as in claim 11 wherein the enrichment results in a cell population in which at least 10% of the cells are MPCs that are colony forming.

13. A method of enriching mesenchymal precursor cells as in claim 12 wherein the enrichment results in a cell population in which at least 40% of the cells are MPCs that are colony forming.

14. A method of enriching mesenchymal precursor cells as in claim 1 wherein the marker is the absence of cell surface markers indicative of commitment such as, CBFA-1, collagen type II, PPARγ2, glycophorin A.

15. A method of enriching mesenchymal precursor cells as in claim 4 wherein the method includes a first step of making a first partially enriched pool of cells by enriching for the positive expression of a first of the markers, and a second step of enriching for the positive expression of the second of the markers from the partially enriched pool of cells.

16. A method of enriching mesenchymal precursor cells as in claim 15 wherein the first step is a solid phase sorting step based on recognition of one or more of the markers, and the second step uses a more accurate separation method based on recognition of one or more of the markers, wherein the first step gives an enriched population with greater numbers of cells than if a high accuracy sorting step was used as a first step.

17. A method of enriching mesenchymal precursor cells as in claim 16 wherein the second step involves the use of two or more markers.

18. A method of enriching mesenchymal precursor cells as in claim 17 wherein the first step utilises MACS recognising expression of the antigen identified by STRO-1.

19. A method of enriching mesenchymal precursor cells as in claim 18 wherein the second sorting step utilises two colour FACS recognising expression of the antigen identified by STRO-1 as well as the expression of VCAM-1.

20. A method of enriching mesenchymal precursor cells as in claim 4 wherein recognition of cells carrying the cell surface markers is effected by binding a binding agent to the marker concerned followed by separation of those cells that exhibit binding, being either high level binding, low level binding or no binding.

21. A method of enriching mesenchymal precursor cells as in claim 20 wherein the binding agent is a monoclonal antibody or molecule based on a monoclonal antibody.

22. A method of enriching mesenchymal precursor cells as in claim 4 wherein the source of material for enrichment is stromal stem cells from one or more of the list including bone marrow, blood, epidermis and hair follicles.

23. A method of enriching mesenchymal precursor cells as in claim 22 wherein the source of material for enrichment is bone marrow.

24. A method of enriching mesenchymal precursor cells as in claim 4 wherein the method also includes the harvesting of a source of the stem cells before the enrichment step.

25. An enriched cell population wherein at least 1% of the cells are mesenchymal precursor cells that are colony forming.

26. An enriched cell population as in claim 25 wherein the cells carry at least two markers selected from a group of surface markers specific for mesenchymal precursor cells including LFA-3, THY-1, antigen identified by STRO-1, VCAM-1, ICAM-1,

PECAM-1, P-selectin, L-selectin, CD49b/CD29, CD49c/CD29, CD49d/CD29, CD29, CD18, CD61, 6-19, thrombomodulin, CD10, CD13 and SCF.

27. An enriched cell population as in claim 26 wherein the cells carry the antigen identified by STRO-1 and VCAM-1.

28. An enriched cell population wherein at least 5% of the cells are mesenchymal precursor cells that are colony forming.

29. An enriched cell population as in claim 28 wherein the cells carry at least two markers selected from a group of surface markers specific for mesenchymal precursor cells including LFA-3, THY-1, antigen identified by STRO-1, VCAM-1, ICAM-1, PECAM-1, P-selectin, L-selectin, CD49b/CD29, CD49c/CD29, CD49d/CD29, CD29, CD18, CD61, 6-19, thrombomodulin, CD10, CD13 and SCF.

30. An enriched cell population as in claim 29 wherein the cells carry the antigen identified by STRO-1 and VCAM-1.

31. An enriched cell population wherein at least 10% of the cells are mesenchymal precursor cells that are colony forming.

32. An enriched cell population as in claim 31 wherein the cells carry at least two markers selected from a group of surface markers specific for mesenchymal precursor cells including LFA-3, THY-1, antigen identified by STRO-1, VCAM-1, ICAM-1, PECAM-1, P-selectin, L-selectin, CD49b/CD29, CD49c/CD29, CD49d/CD29, CD29, CD18, CD61, 6-19, thrombomodulin, CD10, CD13 and SCF.

33. An enriched cell population as in claim 32 wherein the cells carry the antigen identified by STRO-1 and VCAM-1.

34. An enriched cell population wherein at least 40% of the cells are mesenchymal precursor cells that are colony forming.

35. An enriched cell population as in claim 34 wherein the cells carry at least two markers selected from a group of surface markers specific for mesenchymal precursor cells including LFA-3, THY-1, antigen identified by STRO-1, VCAM-1, ICAM-1,

PECAM-1, P-selectin, L-selectin, CD49b/CD29, CD49c/CD29, CD49d/CD29, CD29, CD18, CD61, 6-19, thrombomodulin, CD10, CD13 and SCF.

36. An enriched cell population as in claim 35 wherein the cells carry the antigen identified by STRO-1 and VCAM-1.

37. An enriched population of mesenchymal precursor cells as purified by the method of claim 1.

38. An enriched population of mesenchymal precursor cells as purified by the method of claim 8.

39. An enriched population of mesenchymal precursor cells as purified by the method of claim 19.

40. An enriched population of mesenchymal precursor cells as in either of claim 25 or claim 37 wherein a proportion of the mesenchymal precursor cells are capable of differentiation into at least two committed cell types selected from the group including adipose, areolar, osseous, cartilaginous, elastic and fibrous connective.

41. An enriched population of mesenchymal precursor cells as in either of claim 25 or claim 37 wherein the enriched population is suitable for seeding onto a vehicle for implantation to assist in bone growth.

42. An enriched population of mesenchymal precursor cells as in either of claim 25 or claim 37 wherein the enriched population has an exogenous nucleic acid transformed in to it so that the population may be introduced into the body of a patient to treat a disease or condition.

43. An enriched population of mesenchymal precursor cells as in either of claim 25 or claim 37 wherein the enriched population has an exogenous nucleic acid that expresses a therapeutic agent transformed in to it so that the population may be introduced into the body of a patient to release the therapeutic agent.

44. An enriched population of stem cells as in either of claim 25 or claim 37 wherein the enriched population is used to augment bone marrow transplantation.

45. A composition including the enriched population of claim 25.

46. A composition including the enriched population of claim 37.

47. A composition as in either of claim 45 or 46 wherein the composition is preadsorbed onto ceramic vehicles that are precoated with fibronectin and are suitable for implantation to augment bone marrow transplantation.

48. A composition as in either of claim 45 or 46 wherein the composition is suitable for use in augmenting bone marrow transplantation.

49. A composition as in claim 48 wherein the composition also includes haemopoietic cells.

50. A composition as in either of claim 45 or 46 wherein the population has an exogenous nucleic acid transformed in to it so that the composition may be introduced into the body of a patient to treat a disease or condition.

51. A composition as in either of claim 45 or 46 wherein the population has an exogenous nucleic acid that expresses a therapeutic agent transformed in to it so that the composition may be introduced into the body of a patient to release the therapeutic agent.